

AMENDMENTS TO THE CLAIMS

1-22. (Canceled)

23. (Currently amended) A porous cross-linked metal oxide or silicon oxide based aerogel material produced by:

(a) first, forming a metal oxide or silicon oxide based sol-gel preformed material prior to reaction with an organic cross-linking agent,

(b) contacting the preformed metal oxide or silicon oxide based sol-gel preformed material with an organic cross-linking agent, the cross-linking agent comprising an organic compound that provides an organic conformal coating surface layer chemically bound to surfaces of said metal oxide or silicon oxide based sol-gel preformed material and then,

(c) drying the cross-linked metal oxide or silicon oxide based sol-gel preformed material provided with a conformal coating the surface layer of chemically bound organic material to form the porous cross-linked metal oxide or silicon oxide based aerogel material.

24. (Canceled)

25. (Currently amended) A cross-linked metal oxide or silicon oxide based sol-gel material, comprising

a metal oxide or silicon oxide based sol-gel preformed material that has been formed prior to reaction with an organic cross-linking agent, said metal oxide or silicon oxide based sol-gel preformed material having a conformal coating surface layer of an organic substance formed by chemical bonding of an organic cross-linking agent to surfaces of said metal oxide or silicon oxide based sol-gel preformed material after formation of said metal oxide or silicon oxide based sol-gel preformed material so as to form said cross-linked metal oxide or silicon oxide based sol-gel material.

26. (Currently amended) The cross-linked metal oxide or silicon oxide based sol-gel material of claim 25, wherein the cross-linking agent comprises at least about 2% by weight based on the total weight of the cross-linked metal oxide or silicon oxide based sol-gel material.

27. (Currently amended) The cross-linked metal oxide or silicon oxide based sol-gel material of claim 25, wherein the cross-linking agent comprises at least about 5% by weight based on the total weight of the cross-linked metal oxide or silicon oxide based sol-gel material.

28. (Currently amended) The cross-linked metal oxide or silicon oxide based sol-gel material of claim 25, wherein the cross-linking agent comprises at least about 10% by weight based on the total weight of the cross-linked metal oxide or silicon oxide based sol-gel material.

29. (Currently amended) The cross-linked metal oxide or silicon oxide based sol-gel material of claim 25, wherein the cross-linking agent comprises at least about 30% by weight based on the total weight of the cross-linked metal oxide or silicon oxide based sol-gel material.

30. (Currently amended) The cross-linked metal oxide or silicon oxide based sol-gel material of claim 25, wherein the cross-linking agent comprises at least about 50% by weight based on the total weight of the cross-linked metal oxide or silicon oxide based sol-gel material.

31. (Currently amended) The cross-linked metal oxide or silicon oxide based sol-gel material of claim 25, wherein the cross-linking agent comprises at least about 80% by weight based on the total weight of the cross-linked metal oxide or silicon oxide based sol-gel material.

32-35. (Canceled)

36. (Previously Presented) The sol-gel material of claim 25, wherein the preformed metal oxide or silicon oxide based sol-gel material is silica based.

37. (Previously Presented) The cross-linked metal oxide or silicon oxide based sol-gel material of claim 25, wherein the cross-linking agent is a diisocyanate, a triisocyanate, a polyisocyanate, or a mixture thereof.

38. (Previously Presented) The cross-linked metal oxide or silicon oxide based sol-gel material of claim 25, wherein the cross-linking agent is hexamethylene diisocyanate, poly(hexamethylene diisocyanate), toluene diisocyanate, diphenylmethane diisocyanate, an aliphatic polyisocyanate, triphenylmethyl triisocyanate, or a mixture thereof.

39. (Previously Presented) The cross-linked metal oxide or silicon oxide based sol-gel material of claim 25, wherein the cross-linked metal oxide or silicon oxide based sol-gel material is more resistant to rupture under load than the preformed metal oxide or silicon oxide based sol-gel material prior to cross-linking with the cross-linking agent.

40. (Currently amended) A cross-linked metal oxide or silicon oxide based aerogel material formed by drying of the cross-linked metal oxide or silicon oxide based sol-gel material of claim 25, the drying being carried out using at least one of solvent exchange, evaporation, or supercritical drying, or both.

41. (Previously Presented) The cross-linked metal oxide or silicon oxide based aerogel material of claim 40, wherein the liquefied gas is nitrogen, argon, helium, hydrogen, or oxygen.

42. (Previously Presented) The cross-linked metal oxide or silicon oxide based aerogel material of claim 40, wherein the hydrocarbon is kerosene, gasoline, jet fuel, or rocket fuel.

43-46. (Canceled)

47. (Previously Presented) A thermal insulating material comprising the sol-gel material of claim 25.

48. (Original) A tile, door, panel, shingle, shutter, beam, cooler, article of clothing, shoe, or boot comprising the thermal insulating material according to claim 47.

49. (Previously Presented) A structural material comprising the material of claim 25.

50-68. (Canceled)

69. (Previously Presented) The metal oxide or silicon oxide based sol-gel material of claim 25 wherein a chemical functionality of the surfaces of said metal oxide or silicon oxide based sol-gel material acts as a template for reaction with, accumulation of, or both, the cross-linking agent.

70. (Previously Presented) The metal oxide or silicon oxide based sol-gel material of claim 25 wherein the surfaces of the metal oxide or silicon oxide based sol-gel material act as a template for the cross-linking agent.

71. (Previously Presented) The sol-gel material of claim 25 comprising an attached group wherein the cross-linking agent comprising an organic compound includes the attached group.

72. (Canceled)

73. (New) The sol-gel material of claim 40 wherein the aerogel material does not collapse when in contact with a liquid that comprises water, an alcohol, an ether, a hydrocarbon, an ester, a ketone, a carboxylic acid, a phosphoric acid, or a liquefied gas.